

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of manufacturing an illumination optical unit comprising ~~unit, including a light source a beam splitting element for splitting to split~~ a beam emitted from ~~a the~~ light source into a plurality of partial ~~beams, a beams; a~~ light focusing element ~~for focusing to focus~~ the partial ~~beams, and beams; and~~ a polarization converting element ~~for making to make~~ the polarization directions of the partial beams uniform, the method comprising:

~~a first positioning step of first~~ adjusting a relative position on a predetermined optical path of the light focusing element and the polarization converting element on the basis of the shapes thereof, and fixing the position of the light focusing element and the polarization converting element;

~~a beam introducing step of~~ introducing a beam on the light focusing element and the polarization converting element of which position is adjusted during the first ~~positioning step adjusting~~ and the beam splitting element disposed on the predetermined optical path;

~~an optical image forming step of~~ transmitting the beam introduced by the beam introducing ~~step~~ into the light focusing element, the polarization converting element and the beam splitting element to form an optical image on a projection screen;

~~an optical image detecting step of~~ detecting the optical image formed in the optical image forming ~~step~~;

~~an illumination area comparing step of~~ calculating a comparison result of an illumination area of the optical image detected in the optical image detecting ~~step~~ with a designed illumination area;

~~an optimal-state determining step of determining whether the illumination area of the optical image is in the optimal state with respect to the designed illumination area or not on the basis of the comparison result from the illumination-area comparing-step;~~

~~a beam-splitting element position adjusting step of adjusting the relative position of the beam splitting element with respect to the light focusing element and the polarization converting element on the basis of the comparison result calculated in the illumination area comparing-step~~ comparing, when the illumination area of the optical image is determined not in the optimal position in the optimal-state determining-step; and

~~a second positioning step of fixing the position of the beam splitting element when the illumination area of the optical image is determined to be in the determined optimal state in the optimal-state determining step.~~

2. (Currently Amended) The method of manufacturing an illumination optical unit according to Claim 1, ~~wherein a separating-criterial~~ frame representing the shape of the designed illumination area is being formed on the projection screen,

~~wherein the optical image on the projection screen and the separating-criterial frame are being~~ detected by an image pick-up device in the optical image detecting-step,

~~wherein the illumination-area comparing-step comprises~~ comprising:

~~an image fetching step of fetching an image detected in the optical image and the separating-criterial frame detected by the optical image detecting step as an image,~~

~~a brightness-value acquiring step of acquiring the brightness-value of the optical image in units of pixels by the optical image fetched in the image fetching step;~~

~~a scanning-line selecting step of selecting scanning lines set to extending across~~ inside and outside the illumination area of the optical image;

~~a brightness-value adjusting curve acquiring step of acquiring a brightness-value adjusting curve showing a change in brightness values according to pixel position on~~

the scanning line selected in the scanning-line selecting ~~step~~ on the basis of the brightness-value acquired in the brightness-value acquiring ~~step~~;

~~an approximate straight line calculating step~~ of calculating an approximate straight line by linearly approximating a brightness-value adjusting section between a portion showing the outside of the illumination area of the optical image and a portion showing the inside of the illumination area based on the brightness-value adjusting curve acquired by the brightness-value adjusting-curve acquiring ~~step~~;

~~a boundary point acquiring step~~ of acquiring boundary points of the illumination area of the optical image on the basis of the approximate straight line calculated in the approximate-straight-line calculating ~~step~~; and

~~an illumination margin calculating step~~ of calculating an illumination margin of the illumination area of the optical image relative to the separating criterial frame by comparing the positions of the boundary points acquired in the boundary-point acquiring ~~step~~ with the position of the separating criterial frame.

3. (Currently Amended) The method of manufacturing an illumination optical unit according to Claim 1, wherein the ~~designed illumination area~~criterial frame is set to be substantially square,

~~wherein~~ the scanning-line selecting ~~step~~, the brightness-value adjusting-curve acquiring ~~step~~, the approximate-straight-line calculating ~~step~~ and the boundary-point acquiring ~~step~~ are being performed a plurality of times along the mutually opposing sides of the separating criterial frame image, and

~~wherein~~, in the illumination-margin calculating ~~step~~, the illumination margin M is calculated according to the following Expression (1), where Da represents a distance between opposing sides of the separating criterial frame, and Ds represents a distance between a boundary point along one side of the mutually opposing sides of the separating

criterial frame and another boundary point along the other side of the mutually opposing sides of the ~~separating~~ criterial frame in a direction orthogonal to the mutually opposing sides.

$$M = (D_s - D_a)/2 \quad (1)$$

4. (Currently Amended) The method of manufacturing an illumination optical unit according to Claim 1, wherein the illumination-area ~~comparing~~ step further comprises:

~~a separating frame image center position calculating step~~ of calculating an image center position of the criterial frame from the image fetched in the image fetching step;

~~an optical image center position calculating step~~ of calculating an image center position of the illumination area of the optical image from the positions of boundary points acquired in the boundary points acquiring step; and

~~an image center deviation amount calculating step~~ of calculating the deviation amount of the center position of the ~~separating~~ criterial frame and the center position of the illumination area of the optical image; and

~~wherein~~ the optimal-state determining ~~step~~ determines that the illumination area of the optical image is in the optimal state when the illumination margin M calculated in the illumination-margin calculating ~~step~~ is at least the preset threshold value and when the deviation amount calculated in the image center position deviation-amount calculating ~~step~~ is the preset threshold value or below.

5. (Currently Amended) The method of manufacturing an illumination optical unit according to Claim 1, wherein the beam-splitting-element position-~~adjusting~~ step adjusting, further comprises:

when an optical axis of the beams introduced in the beam introducing ~~step~~ is the Z axis and when two axes orthogonal to the Z axis and orthogonal to each other are the X

axis and the Y axis, respectively, ~~an X-axis position adjusting step of moving the beam~~
splitting element in the direction of the X axis;

~~a Y-axis position adjusting step of moving the beam~~ splitting element in the
direction of the Y axis; and

~~and an in-plane rotational position adjusting step of rotating the beam~~ splitting
element around the Z axis.

6. (Currently Amended) The method of manufacturing an illumination optical
unit according to Claim 1,

~~wherein an uncured photo-curing adhesive is being~~ coated on the beam
splitting element before the illumination area comparing ~~step~~; and

~~wherein the photo-curing adhesive is being~~ irradiated with rays to cure the
photo-curing adhesive to fix the beam splitting element in the ~~second positioning~~
~~process~~ beam splitting element position-fixing.

7. (Currently Amended) A method of manufacturing a ~~projector comprising~~
projector, comprising

_____ the method of manufacturing an illumination optical unit according to claim 1.

8. (Original) An illumination optical unit manufactured by the method of
manufacturing an illumination optical unit according to Claim 1.

9. (Currently Amended) A ~~projector comprising~~ projector, comprising
_____ the illumination optical unit according to Claim 8.

10. (Currently Amended) An apparatus ~~for manufacturing to manufacture~~ an
illumination optical unit ~~comprising including~~ a beam splitting element ~~for splitting to split~~ a
beam emitted from a light source into a plurality of partial beams, a light focusing element ~~for~~
~~focusing to focus~~ the partial beams and a polarization converting element ~~for making to make~~
polarization directions of the partial beams uniform, the apparatus comprising:

an element holding member ~~for holding to hold~~ the light focusing element and the polarization converting element which are positioned and fixed by adjusting their relative position on the basis of the shapes thereof on a predetermined optical path;

a beam-splitting-element holding member ~~for holding to hold~~ the beam splitting element disposed on the predetermined optical path;

a light source ~~for introducing to introduce~~ beams to the beam splitting element, the light focusing element, and the polarization converting element;

a projection screen onto which an optical image of the beams is projected through the beam splitting element, the light focusing element and the polarization converting element;

a position adjusting unit ~~for adjusting to adjust~~ the relative position of the beam splitting element with respect to the light focusing element and the polarization converting element;

a positioning and fixing unit ~~for fixing to fix~~ the position of the beam splitting element;

an image pick-up element ~~for picking up to pick up~~ an optical image formed on the projection screen;

an image fetcher ~~for fetching to fetch~~ the optical image picked-up by the image pick-up element as an image; and

an image processor ~~for processing to process~~ the image fetched by the image fetcher,

wherein the image processor ~~comprises:~~ including

—————~~an illumination area comparing means for calculating device to calculate a~~
comparison result of an illumination area of the optical image with a designed illumination area based on the image fetched by the image fetcher; and

_____an optimal state determining ~~means for determining~~ device to determine
whether the beam splitting element is located at the optimal position on the basis of the
comparison result calculated by ~~from~~ the illumination area comparing ~~means~~ device.